

REMARKS

Claims 1 to 13 are pending in this application. Claims 1 and 13 have been amended to clarify that the titanium element is constructed from a material selected from the group consisting of elemental titanium and titanium alloys. This amendment clarifies that “titanium” refers to “pure” titanium and titanium-rich alloys (p. 13, lines 27-30). Support for this amendment can be found through the specification, including for example p. 14, lines 28-29. Applicant respectfully requests reconsideration in view of the amendment above and the remarks below.

Claim Rejections**35 U.S.C. §103(a)**

The Examiner rejects claims 1, 7, 12, and 13 under 35 U.S.C. §103(a) as obvious over WO 96/37281 to Disanayaka et al. (“Disanayaka”) in view of U.S. Patent No. 6,037,289 to Chopin et al. (“Chopin”). The Examiner states that Disanayaka discloses an apparatus for purifying air by means of an activated photocatalyst such as titanium dioxide. The Examiner however admits that Disanayaka fails to disclose a titanium element wherein the titanium element is constructed from a material selected from the group consisting of elemental titanium and titanium alloys having at least about 50% by weight titanium, and cites Chopin to remedy this deficiency. In particular, the Examiner states that Chopin discloses a coating having at least about 50% by weight titanium (col. 10, lines 53-58).

Applicant respectfully disagrees. Chopin discloses a coating of *titanium dioxide* rather than an element constructed from elemental titanium or titanium alloys.

The claimed invention requires a titanium element constructed from elemental titanium or titanium alloys. The titanium element will naturally oxidize and present a surface layer of mixed titanium oxides and related compounds. It is this oxide-rich surface that provides, to a large degree, the photocatalytic effect. Unlike the inherently limited-life titanium dioxide coatings suggested by Disanayaka and Chopin, the titanium catalysts of the present invention provide a self-renewing surface catalyst. Moreover, titanium dioxide coatings are typically applied like pigment in a dissolved or emulsified form which can leave residues that interfere with catalytic activity.

Commercially pure titanium is an excellent oxygen getter under most environmental conditions. As a result, elemental titanium and titanium-rich alloys naturally maintain an oxide-containing film upon its metallic surface. This oxide-containing surface layer will tend to reform as it is used up and fresh metallic surfaces will be exposed to the air as the chemical reactions with the air and impurities therein proceed. Thus, the surfaces of the air purifier build from titanium require less frequent cleaning and/or replacement.

The claimed invention requires a titanium element constructed from a material selected from the group consisting of elemental titanium and titanium alloys having at least about 50% by weight titanium. Neither Disanayaka nor Chopin disclose such a concept. In particular, Chopin, which was cited to remedy the defects of Disanayaka, instead discloses a coating of *titanium dioxide*.

Moreover, Disanayaka and Chopin fail to teach that the titanium or titanium alloy material is at least *about 50% by weight titanium*. The passage (col. 10, lines 53-58) from Chopin cited by the Examiner reads:

In addition, the nature of the crystalline phase of these titanium dioxide particles is preferably predominantly in the anatase crystalline form. "Predominantly" means that the level of anatase in the titanium dioxide particles of the dispersion according to the invention is greater than 50% by mass. Preferably, the particles of the dispersions used exhibit a level of anatase of greater than 80%.

The 50% in this passage refers to the percentage of titanium dioxide that is in the anatase form. Anatase is one mineral form in which titanium dioxide is found. The cited paragraph thus refers to the preferred percentage of this mineral form found in the titanium dioxide particles and in no way suggests the preferred weight percent of elemental titanium or titanium alloy.

Even if Chopin disclosed a weight percentage of titanium dioxide in the coating, one of ordinary skill in the art would have to reason to infer that the titanium element should be constructed with a similar concentration of elemental titanium or titanium alloy. Chopin completely lacks any suggestion that titanium dioxide concentration in a coating could be the basis for deciding upon the concentration of elemental titanium or titanium alloy.

Accordingly, Disanayaka and Chopin cannot anticipate independent claims 1 and 13, and the Applicant respectfully request withdrawal of this rejection.

Claims 1, 5-8, and 13 are rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 5,835,840 to Goswami, in view of Chopin. The Goswami reference discloses a system to disinfect and detoxify indoor duct-transported air, including a housing having an irradiation chamber with a bank of lamps and a duct liner coated with titanium dioxide. Also disclosed is a mesh or matrix to which titanium dioxide can be adhered. As admitted by the Examiner, Goswami fails to disclose a titanium element having titanium or titanium alloys having at least 50% by weight titanium. Chopin is cited to remedy this deficiency.

However, as discussed above, Chopin fails to disclose a titanium element constructed from a material selected from the group consisting of elemental titanium and titanium alloys having at least about 50% by weight titanium. Accordingly, the rejection of independent claims 1 and 13 over Goswami in view of Chopin fails.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Disanayaka in view of Chopin and further in view of U.S. Patent No. 6,391,272 to Schroeder ("Schroeder") and U.S. Patent 4,210,429 to Goldstein ("Goldstein").

Schroeder and Goldstein are cited to teach the limitation of dependent claims 2 and 3. In particular, Schroeder is cited to teach a pollution sensor, and Goldstein is cited to disclose communication with an AC power source. However, neither reference disclose the required titanium element constructed from a material selected from the group consisting of elemental titanium and titanium alloys having at least about 50% by weight titanium. Accordingly, Schroeder and Goldstein cannot remedy the defects of Disanayaka and Chopin. The Applicant therefore respectfully requests this rejection be withdrawn.

Double Patenting

Claims 1-11 are rejected under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 1, 2, and 7-13 of U.S. Patent No. 5,601,786 in view of Disanayaka and further in view of Chopin.

With respect to the obviousness type double patenting rejection over U.S. Patent No. 5,601,786 to Monagan in view of Disanayaka and further in view of Chopin, Applicant submits that the cited references fail to disclose the claimed invention. Nowhere does Monagan '786 teach or disclose the use of a titanium element and Disanayaka and Chopin fail to remedy this

defect. As discussed above, Disanayka and Chopin disclose titanium coatings rather than the claimed titanium element constructed from titanium or titanium alloys. Moreover, both reference fail to disclose a titanium element constructed from materials selected from the group consisting of elemental titanium and titanium alloys having at least about 50% by weight titanium. Accordingly, Applicant respectfully requests withdrawal of the double patenting rejection of Monagan '786 in view of Disanayka and further in view of Chopin.

Conclusion

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue. However, should any issues remain, the Examiner is urged to call the Applicant.

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